UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

May 12, 2021

4SEMD-SSS

MEMORANDUM

SUBJECT: Review of the Revised Fish Tissue Sampling and Analysis Plan in Bear Creek in Support of the EPA Administrator's Dispute Resolution Decision for Radiological Discharge Limits, Oak Ridge, Tennessee

FROM: Shanna Alexander, Toxicologist
Scientific Support Section

SHANNA ALEXANDER
Digitally signed by SHANNA ALEXANDER
Date: 2021.05.12 10:15:45 -04'00'

THROUGH: Tim Frederick, Chief
Scientific Support Section

Tim Frederick
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Date: 2021.05.12 10:20:28 -04'00'

TO: Carl Froede, Remedial Project Manager
Restoration and DOE Coordination Section

Per your request, a review of the Department of Energy's (DOE) revised Fish Sampling and Analysis Plan (SAP) dated May 5, 2021 and submitted on May 7, 2021 has been completed. The results of the fish SAP erratum to the Comprehensive Monitoring Plan will be used to inform development of health-based radiological discharge limits for the Environmental Management Waste Management Facility (EMWMF) and the proposed Environmental Management Disposal Facility (EMDF) that are protective of recreational fishers consuming freshwater fish caught in Bear Creek. It will also be used to evaluate potential exposures to radiological contaminants in fish in Bear Creek. Please consider the following comments regarding my review.

General Comments:

Several statements were made in Section 2 and subsection 3.1.2 (page 11, first paragraph) regarding the fish habitat and availability in Bear Creek that need citation of references. It is also important that references be provided to support statements made in regard to the migration and behavioral patterns of sunfish, the catchable and edible fish population density in Bear Creek, the percent consumption of whole fish versus fillet, and compositing of multiple fish species for consumption by recreational fishers. Recreational fishers who eat rock bass may not eat sunfish

and vice versa. Some of the information presented in subsection 3.1.2 should be reworded for clarity.

Specific Comments:

- **Section 1 "Introduction"** – In describing the purpose of the fish sampling and analysis activities, this section states, "… *radionuclides that would adversely affect recreational fishermen.*" It is suggested that the word *would* be changed to *could* since risk is estimated.

- **Section 2 "Background"** – The following comments pertain to this section:

    - This section states, "Sampling has indicated that the discharged water typically contains low levels of radionuclides." The term *low* is subjective and should be clarified (and qualified) by describing the comparison of the wastewater results to the appropriate discharge limits or some other applicable criteria.
    - The following sentence is awkward and should be reworded: "*Fishing is not allowed on the ORR, including no fishing is allowed along Bear Creek Road.*" For clarity, it is suggested that the words "is allowed" be removed. Further, if signage is posted along Bear Creek Road, please add language stating so.
    - This section states on page 2, "*Although there is no evidence on the ORR, a very small percent of fishers in larger fisheries do consume whole fish.*" It then states, "… *sunfish are usually resident to a given location.*" Please provide references for these statements. Note that there are literature-based studies available on the migratory patterns of sunfish in watersheds and the data indicates that sunfish migration patterns and behavior are seasonal and reflect the tracking of planktonic prey distributions (i.e., sunfish migrate to the location of their food prey items).

- **Figure 1** – Although Figure 1 is titled "Location of Bear Creek on the ORR", the geographical location of Bear Creek is not depicted. Since Bear Creek is the primary focus for the fish sampling, it is pertinent to pinpoint Bear Creek on this figure in lieu of Bear Creek Road.

- **Section 3.1.1 "Sample Locations"** – The following comments pertain to this section.

    - It states, "Figures 2 and 3 show sample locations and historical past biota sampling locations." For clarity and accuracy, it should be mentioned that the biota sampling activities previously conducted at these locations were for non-radionuclides and there are no existing radiological data.
    - The second paragraph should state that the reference stream (Brushy Fork Creek) is upstream of the EMWMF and presumably unimpacted from EMWMF-related radionuclides.
    - The last paragraph mentions the two stream reaches, BCK 7.0 – 9.9 and BCK 11.9 - 12.4, for assessing baseline conditions of radiological contaminants of concern (COCs) in Bear Creek. The reference to "BCK 9.9" should be removed from this sentence and referred to only as BCK 7.0 – 9.9.

- **Section 3.1.2 "Fish Population Surveys"** – The following comments pertain to this section.

    - This section states, "In addition, fish population surveys will be conducted at the additional evaluation points BCK 9.9 and 12.4. Please provide the full stream reaches in lieu of individual sampling points since these surveys are expected to be performed over approximately 80 to 100 meters.
    - On page 11, the first paragraph mentions a fish size requirement of approximately 60 grams of fish fillets as being necessary to perform the radionuclide analyses then the size requirement changes to 40 to 60 grams. Since one duplicate per 8-10 samples would be collected, it is recommended that the size requirement be consistently established at 40 to 60 grams per fish tissue sample. In addition, the following sentence is unclear and should be omitted or reworded for clarity: "*As further described in Sect. 3.1.3, larger fish are preferred, of sufficient size for one sample from each fish.*"
    - The SAP mentions that it is appropriate to combine composite results from small fish with discrete sample results from larger fish (i.e., bass) when computing statistics because it was assumed that people who consume fish typically combine all types of fish in their meals. While it is acceptable to evaluate a scenario where a recreational fisher may consume both sunfish and bass, additional fish consumption scenarios should be evaluated to account for those recreational fishers that consume either bass or sunfish only. It is recognized that the decision on how to composite the samples at each POE will be made by the project team based on the size, type, and number of fish collected. However, once a decision is made, the fish tissue sample results should be presented and assessed separately for different fish species (i.e., rock bass versus sunfish) to account for these additional fish ingestion scenarios. Fish tissue samples should also include the skin and muscle tissue (after scaling and removal of gullet and fins) and the composite tissue samples should be collected per fish species per POE location and combined prior to homogenization.

- **Section 3.1.3 "Fish Tissue Sampling"** – As noted in the previous comment, the following sentence is unclear and should be omitted or reworded for clarity: "*As further described in Sect. 3.1.3, larger fish are preferred, of sufficient size for one sample from each fish.*" In addition, please reword the following sentence for clarity: "*If sufficient larger fish are not present at a given location, then enough mass for fish tissue sampling can be difficult to collect at some locations and seasons.*"

- **Section 3.2 "Methods"** – On page 14, it states, "… includes the sampling procedures and analytical methods used for this one-time sampling and analysis plan." It is unnecessary to describe the SAP as "one-time". Please omit "one-time" from this sentence as any future characterization (if necessary) of Bear Creek is already captured in subsection 3.1.5. In addition, the last stand-alone sentence on this page regarding wet weight fish tissue analysis should be inserted at the end of the first paragraph as it does not warrant its own paragraph.

- **Acronyms** – Add EIT (mentioned on page 21) to the list of acronyms.

If you have any questions regarding this memorandum, you can contact me at 404-562-8635 or alexander.shanna@epa.gov.